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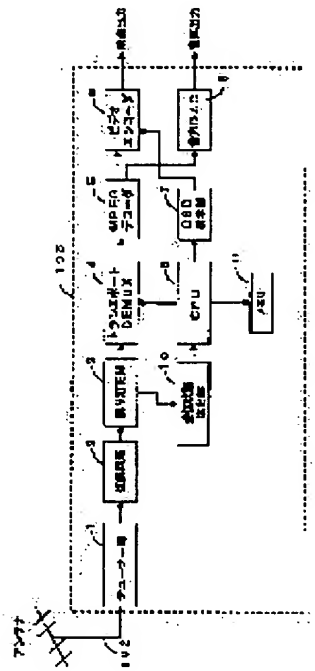
(54) DIGITAL BROADCASTING RECEIVER

(57)Abstract:
PROBLEM TO BE SOLVED: To improve convenience when a user operates a receiver by retrieving plural channels to be transmitted with a given interval in a standby state, judging whether or not reception is possible at a reception condition detection part and storing a channel judged to be receivable in a memory.
SOLUTION: This device is a digital broadcasting receiver for receiving a digital broadcasting which transmits plural channels and is equipped with a memory 11 which stores at least receivable channels and a reception condition detection part 10 which detects a reception state of the received signal and judges whether or not the reception signal is receivable. Then, in the standby state, the plural channels to be transmitted with a specified interval are retrieved, it is judged by the reception condition detection part 10 whether or not they are receivable and a channel judged to be receivable is stored in the memory 11. Thus, it is possible to retrieve a channel which enables new reception without a user's operation of the receiver.



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* NOTICES *

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CLAIMS

[Claim(s)]
[Claim 1] The receive section which receives the encoded digital signal, and the error correction section which detects and corrects the error of the received signal, The output section which outputs the signal which superimposed the information on the arbitration separately created by the decoded signal or the decoded signal on the decode section which decodes the signal with which the error was corrected, The memory which is the digital-broadcasting receiver which receives digital broadcasting which possesses and transmits two or more channels, and memorizes the channel receivable at least, While detecting the receive state of the received signal, having the receive state detecting element this input signal judges it to be whether it is ability ready for receiving and searching said two or more channels transmitted at the predetermined spacing in a standby condition The digital-broadcasting receiver characterized by memorizing the channel which judged no ready for receiving by said receive state detecting element, and was judged to be ability ready for receiving in said memory.
[Claim 2] It is the digital-broadcasting receiver according to claim 1 characterized by updating the contents of memory and showing a user a different channel when the channel which judged no ready for receiving by said receive state detecting element, and was judged to be ability ready for receiving in the standby condition while searching said two or more channels transmitted at the predetermined spacing is different from the channel memorized by said memory.
[Claim 3] The digital-broadcasting receiver according to claim 1 or 2 characterized by judging future receiving possibility by said receive state detecting element, memorizing the channel judged that possibility of becoming non-receipt is high in said memory, and showing a user this channel while searching said two or more channels transmitted at the predetermined spacing in a standby condition.
[Claim 4] A digital-broadcasting receiver given in any of claim 1 characterized by supplying a power source to said receive section, the error correction section, and the decode section thru/or claim 3 only when it has said receive section, the error correction section, the decode section, and the power control section that controls the current supply of the output section, and it is in a standby condition and said two or more channels transmitted are searched, they are.
[Claim 5] It is a digital-broadcasting receiver given in any of claim 1 characterized by judging that possibility of becoming non-receipt or non-receipt is high when said receive state detecting element has more errors of the signal detected in said error correction section than a predetermined value, and judging that ability ready for receiving or possibility of becoming non-receipt is low when there are few errors of said signal than a predetermined value thru/or claim 4 they are.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Field of the Invention] Especially this invention relates to the digital-broadcasting receiver which aimed at improvement in a user's convenience in the actuation with respect to a digital-broadcasting receiver.
[0002]
[Description of the Prior Art] Land-based digital broadcasting which performs digital broadcasting using the frequency band of current analog terrestrial broadcasting is going to be started or started in every corner of the earth.
[0003] Here, in the above-mentioned digital broadcasting, an image/voice data is encoded based on the MPEG (Moving Picture Experts Group) method which is the International Standard of coding, such as an image. Moreover, digital modulation techniques, such as OFDM (Orthogonal Frequency Division Multiplex), are used as a technique of transmitting the these-encoded data.
[0004] Hereafter, it outlines about such a digital-broadcasting system.
[0005] Drawing 6 is drawing having shown the outline of a land-based-digital-broadcasting system.
[0006] In drawing 6 , the digital modulation of the image / voice data, and the predetermined addition data which were encoded in the form based on an MPEG method is carried out as a bit stream, and they are put and sent out to the subcarrier of the frequency band assigned to terrestrial broadcasting at a broadcasting station 101.
[0007] It is received by the antenna 102, and it is a receiver (henceforth IRD (Integrated Receiver/Decoder)) 103, an image / voice data, addition data, etc. are decoded, and the broadcast wave sent out at the broadcasting station 101 is displayed on a monitor 104.
[0008] Here, the configuration of the above IRD103 is explained in full detail.
[0009] Drawing 5 is the block diagram showing the example of a configuration of IRD103.
[0010] In drawing 5 , the broadcast wave received with the antenna 102 is inputted into the tuner section 1 which chooses a predetermined channel, and it restores to it to baseband in a demodulator circuit 2. And after correcting the error of data in the error correction section 3, image data and voice data are separated from a bit stream by transport DEMUX 4. The image data and voice data which were separated are decoded by the MPEG decoder 5. The decoded image data are changed and outputted to the standard methods (for example, NTSC system etc.) of television with the video encoder 8. On the other hand, voice data is outputted as an analog sound signal through voice (Digital/Analog Converter) DAC 9.
[0011] Moreover, various addition data were superimposed on said image data with the directions from CPU6 and this CPU6 for controlling the IRD103 whole, or it has the OSD (On Screen Display) display 7 switched and displayed.
[0012]
[Problem(s) to be Solved by the Invention] In the above land-based digital broadcasting, although a broadcast wave is transmitted using two or more frequencies, the situation of a receivable channel changes according to the condition of an electric wave.
[0013] Change of a receiving situation can newly receive [the channel whose reception was not completed until now] now, or this means that there is a case where it becomes impossible to receive the channel which had been received conversely until now.
[0014] Moreover, by adding new service after broadcast initiation, when the channel which newly becomes receivable is added, or also when a channel plan is changed, it is expected.
[0015] In such a situation, by the above-mentioned conventional IRD, in order to set up a beforehand receivable

channel, the channel search is performed, and this is very troublesome for the user.
[0016] It makes for this invention to raise the convenience at the time of a user operating IRD in view of the above situations into a technical problem, and the digital-broadcasting receiver which solved this is offered.
[0017]
[Means for Solving the Problem] This invention was considered as the following configurations, in order to solve the above-mentioned technical problem. Namely, the receive section which receives the encoded digital signal and the error correction section which detects and corrects the error of the received signal, The output section which outputs the signal which superimposed the information on the arbitration separately created by the decoded signal or the decoded signal on the decode section which decodes the signal with which the error was corrected, The memory which is the digital-broadcasting receiver which receives digital broadcasting which possesses and transmits two or more channels, and memorizes the channel receivable at least, While detecting the receive state of the received signal, having the receive state detecting element this input signal judges it to be whether it is ability ready for receiving and searching said two or more channels transmitted at the predetermined spacing in a standby condition The channel which judged no ready for receiving by said receive state detecting element, and was judged to be ability ready for receiving was memorized in said memory.
[0018] When the channel which judged no ready for receiving by said receive state detecting element, and was judged to be ability ready for receiving in the standby condition here while searching said two or more channels transmitted at the predetermined spacing is different from the channel memorized by said memory, it is desirable to update the contents of memory and to show a user a different channel.
[0019] Moreover, while searching said two or more channels transmitted at the predetermined spacing in a standby condition, future receiving possibility is judged by said receive state detecting element, and the channel judged that possibility of becoming non-receipt is high is memorized in said memory, and you may make it show a user this channel.
[0020] Furthermore, only when it has said receive section, the error correction section, the decode section, and the power control section that controls the current supply of the output section, and it is in a standby condition and said two or more channels transmitted are searched, it is desirable to supply a power source to said receive section, the error correction section, and the decode section.
[0021] In addition, when said receive state detecting element has more errors of the signal detected in said error correction section than a predetermined value, it judges that possibility of becoming non-receipt or non-receipt is high, and when there are few errors of said signal than a predetermined value, you may make it judge that ability ready for receiving or possibility of becoming non-receipt is low.
[0022] By considering as the above configurations, the receive state of a perimeter wave number band is checked, and when the receiving level which becomes receivable is obtained, it can be notified in case a user will use it for the list of receivable channels next in addition automatically, if the channel is a channel newly added.
[0023] Moreover, the receiving level of each frequency band can be got to know from the number of errors of the error correction result in a transport packet, and as compared with the compound value which has set up this value beforehand, if there are few errors, it can be judged that sufficient receiving reinforcement was obtained.
[0024] Therefore, it becomes possible to investigate whether it is in the condition that which channel is receivable by performing such processing to the perimeter wave number band currently used by terrestrial broadcasting.
[0025]
[Embodiment of the Invention] Hereafter, the operation gestalt of the land-based-digital-broadcasting receiver (henceforth IRD) by this invention is explained.
[0026] Drawing 1 is the block diagram showing the configuration of IRD concerning the 1st operation gestalt of this invention, and gives the same sign to the same component as the conventional thing shown in drawing 5 .
[0027] In drawing 1 , the broadcast wave received with the antenna 102 is inputted into the tuner section 1 which chooses a predetermined channel, and it restores to it to baseband in a demodulator circuit 2. And after correcting the error of data in the error correction section 3, image data and voice data are separated from a bit stream by transport DEMUX 4. The image data and voice data which were separated are decoded by the MPEG decoder 5. The decoded image data are changed and outputted to the standard methods (for example, NTSC system etc.) of television with the video encoder 8. On the other hand, voice data is outputted as an analog sound signal through voice DAC 9.

[0028] Moreover, various addition data were superimposed on said image data with the directions from CPU6 and this CPU6 for controlling the IRD103 whole, or it has the OSD display 7 switched and displayed.
[0029] Furthermore, the receive state of the channel chosen with the tuner is detected by the receiving situation detecting element 10, and a control signal is sent out to CPU6. This is for supervising change of the receive state of the channel as which the condition of the received electric wave was changed as a result chosen, and judging the propriety of reception.
[0030] Detection of the receiving situation in this receiving situation detecting element 10 can be realized by judging that it is non-receipt etc., when the frequency of a data error is detected in the error correction section 3 and this frequency increases more than a predetermined value.
[0031] Next, the 1st operations sequence of IRD concerning this invention is explained.
[0032] Drawing 3 is a flow chart which shows the 1st operations sequence.
[0033] drawing 3 -- setting -- usual -- being working (step S101) -- a user stops use and waits to move to a standby condition (step S102).
[0034] If it shifts to a standby condition, the frequency band currently used [that fixed time amount passes and] by waiting (step S103) and terrestrial broadcasting is searched in order (step S104).
[0035] The receive state of the channel contained in the selected frequency is investigated (step S105), and when there is a channel which the receive state was good and had not received until now (step S106), it registers with a list as a channel which newly became receivable (step S107).
[0036] The above-mentioned procedure is performed to all frequency bands (step S108).
[0037] If a check is completed to all frequency bands, it will wait to shift to the normal mode (step S109).
[0038] The above processing is repeated, when showing a user the list of the new channels detected when shifting to normal operation (step S110) and not shifting to normal operation.
[0039] Next, the 2nd operations sequence of IRD concerning this invention is explained.
[0040] Drawing 4 is a flow chart which shows the 2nd operations sequence.
[0041] The operations sequence of **** 2 is the processing which receiving level is low and added retrieval of the channel to which reception may become impossible to the 1st operations sequence of the above.
[0042] In drawing 4 , it waits to move from a normal operating state (step S201) to a standby condition (step S202).
[0043] If it shifts to a standby condition, the channel contained [carrying out fixed time amount progress and] in waiting (step S203) and each frequency band will be searched (step S204).
[0044] The receive state of the channel contained in the selected frequency band is investigated (step S205), and when there is a channel which the receive state was good and had not received until now (step S206), it registers with a list as a channel which newly became receivable (step S207).
[0045] It is judged at step S205 that receiving level is low, and, in the case of the channel whose channel then chosen was ability ready for receiving until now (step S208), reception will register with a list from now on as a channel which may become impossible (S209). When there is much frequency of the data error in the error correction section 3 detected by the receiving situation detecting element 10 as the decision technique whether the receiving level in this case is low, receiving level is low, and when the frequency of a data error is low, it is possible to consider that receiving level is high etc.
[0046] The above-mentioned procedure is performed to all frequency bands (step S210), and if the processing to all frequency bands finishes, it will wait for the shift to normal operation (step S211).
[0047] The above processing is repeated, when the list of the channel which newly becomes ability ready for receiving when shifting to normal operation, and the channels to which reception is likely to become impossible is shown to a user (step S212) and the shift to normal operation is not performed.
[0048] Next, the block diagram showing the configuration of IRD concerning the 2nd operation gestalt of this invention is shown in drawing 2.
[0049] At IRD of the 1st operation gestalt explained so far, although the power source is supplied to each component, when searching a channel with the 2nd operation gestalt shown in drawing 2, with it, reduction of power consumption is aimed at by supplying a power source only to a required block.
[0050] IRD of drawing 2 adds the power control section 12 to IRD of drawing 1, and other components are the same as that of IRD of drawing 1.
[0051] The power control section 12 controls the current supply to the MPEG decoder 5, the OSD display 7, the video encoder 8, and voice DAC 9 according to the directions from CPU6. That is, it is controlled to stop the current supply to these components at the time of standby.

[0052] Thereby, at the time of standby, since any current supply other than a component required to search a channel is not performed, power consumption can be reduced.
[0053]
[Effect of the Invention] According to this invention, while the user is not using it, a receive state is investigated, retrieval of the channel which newly becomes receivable can be performed, without a user operating IRD, and it is necessary to cease to force troublesome actuation to a user.
[0054] Moreover, it becomes possible to receive without investigating a channel including the newly added service.
[0055] For this reason, a user becomes possible [always tuning in a favorite channel from the newest ready-for-receiving ability channels].
[0056] Moreover, it becomes possible to aim at reduction of power consumption by supplying a power source only to the circuit required by the way which is the need.

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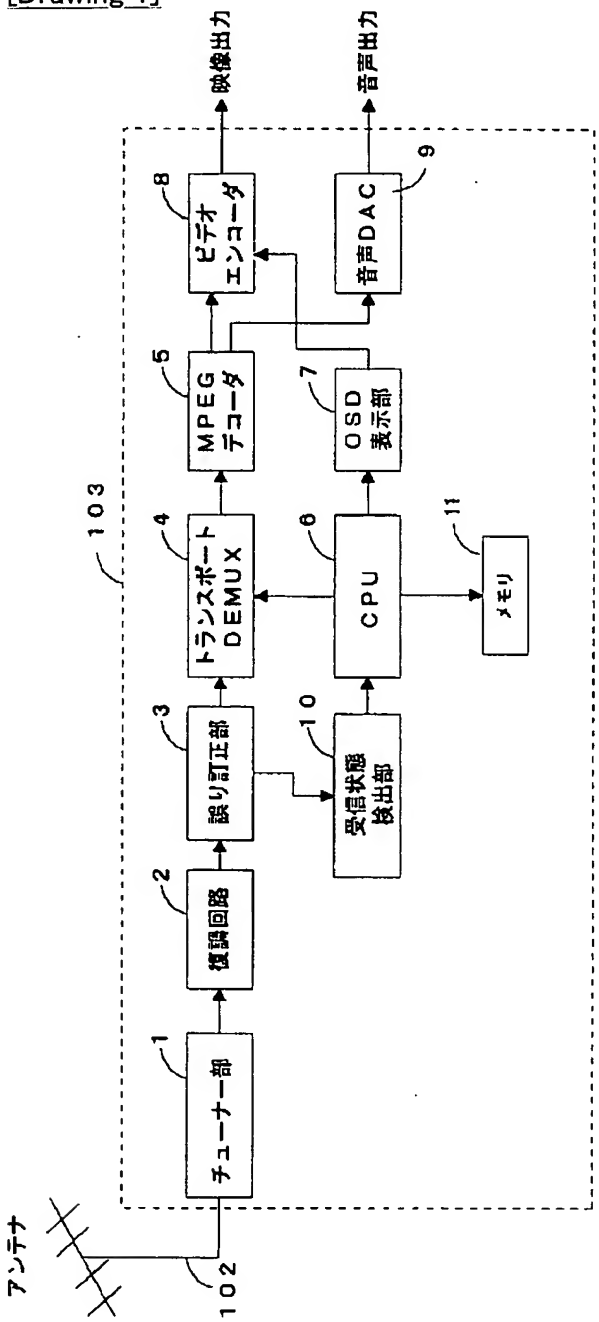
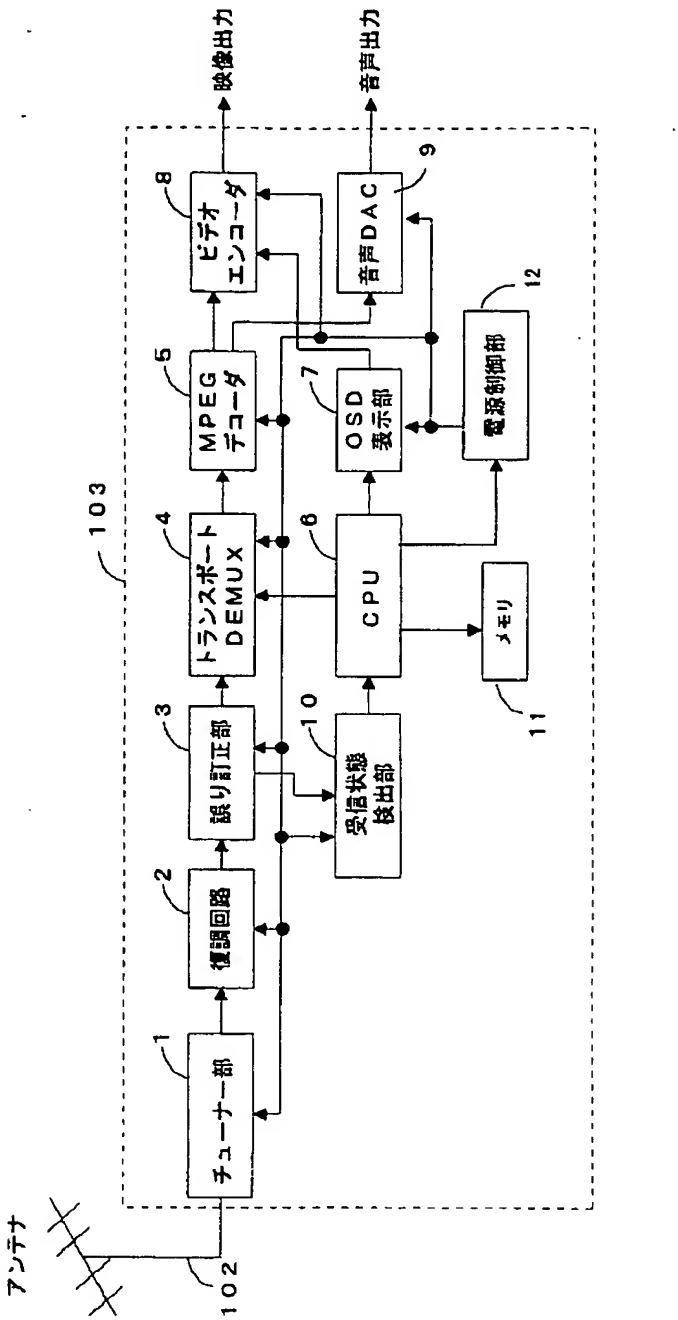
DRAWINGS

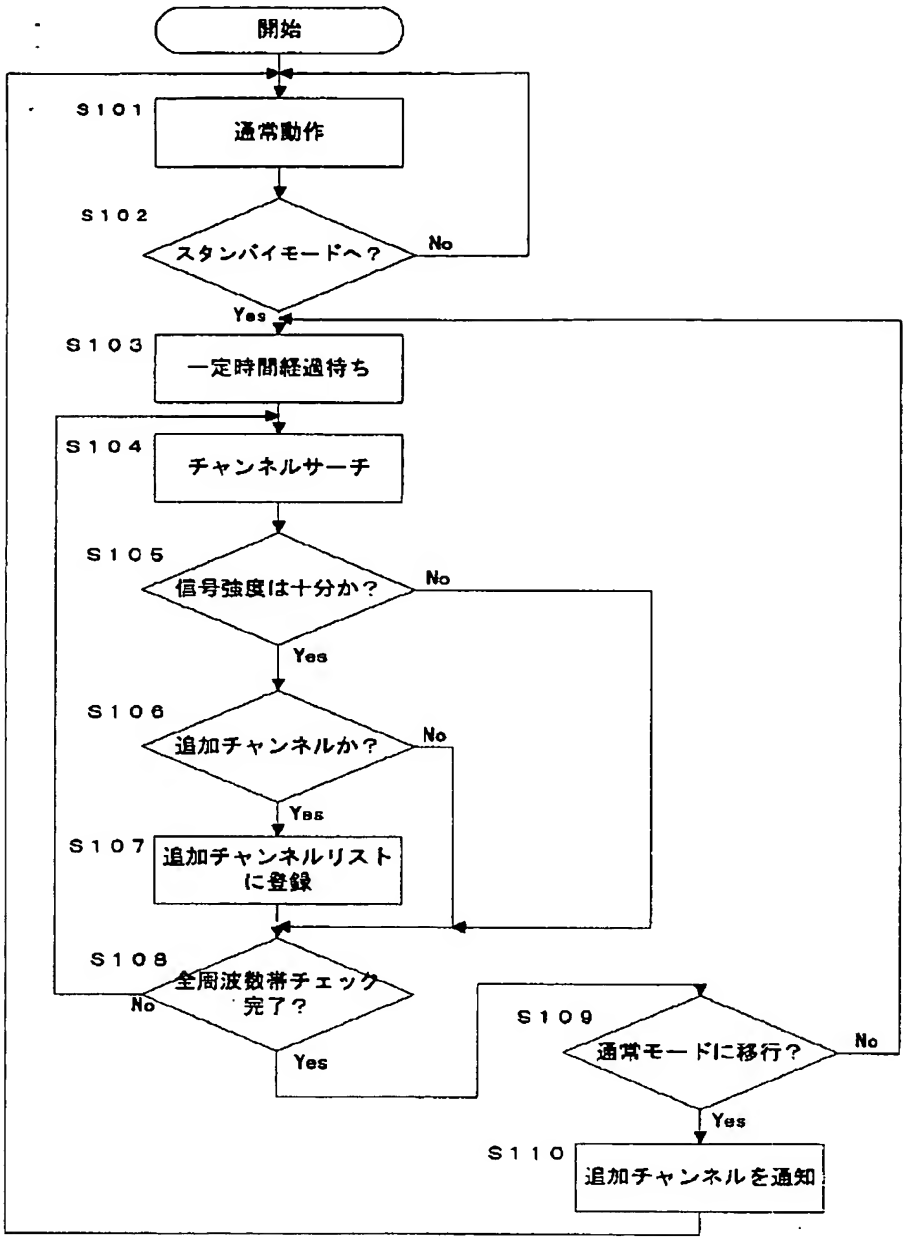
[Drawing 1]



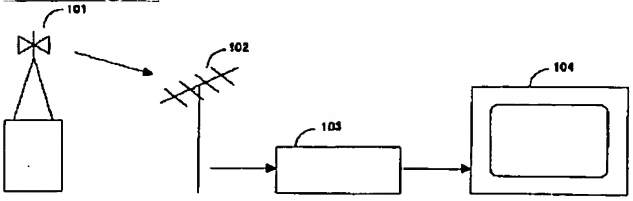
[Drawing 2]


映像出力
音声出力
アンテナ
102
103
チューナー部
1
復調回路
2
誤り訂正部
3
トランスポート DEMUX
4
MPEG デコーダ
5
ビデオ エンコーダ
8
CPU
6
OSD 表示部
7
音声DAC
9
受信状態 検出部
10
メモリ
11
電源制御部
12

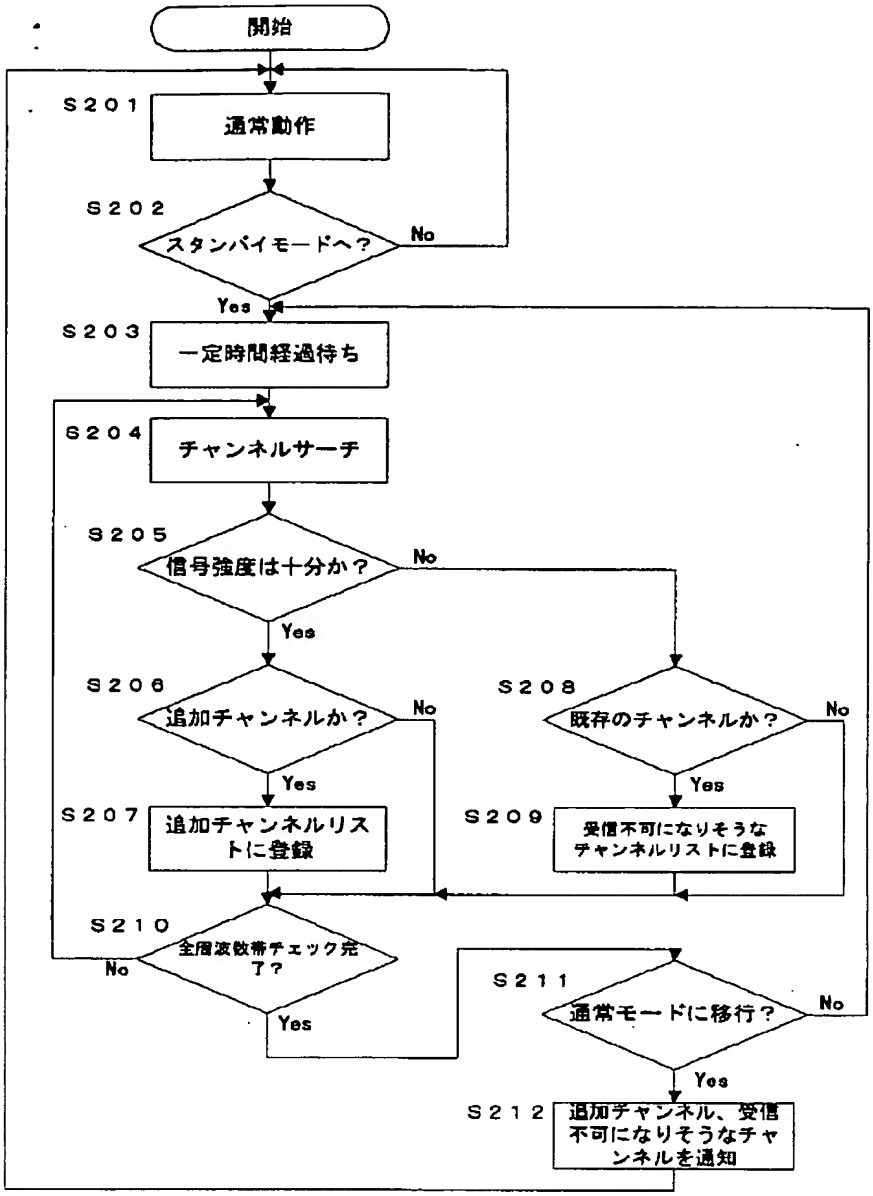
[Drawing 3]



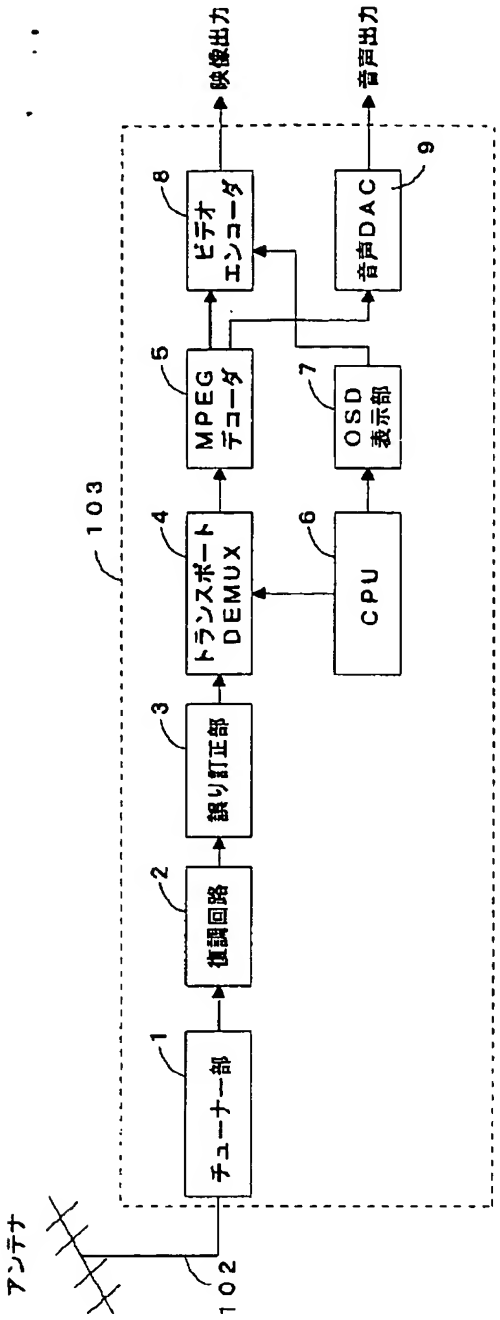
[Drawing 6]



[Drawing 4]


開始
S201
通常動作
S202
スタンバイモードへ？
No
Yes
S203
一定時間経過待ち
S204
チャンネルサーチ
S205
信号強度は十分か？
No
Yes
S206
追加チャンネルか？
No
Yes
S207
追加チャンネルリストに登録
S208
既存のチャンネルか？
No
Yes
S209
受信不可になりそうなチャンネルリストに登録
S210
全周波数帯チェック完了？
No
Yes
S211
通常モードに移行？
No
Yes
S212
追加チャンネル、受信不可になりそうなチャンネルを通知

[Drawing 5]



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